

## DIRECT VIDEO: Electronic Artform for Color Television

(Television has been employed for most of its history as a vehicle for images which originate outside of itself. Direct video synthesis is an electronic means of evoking images from within the television system. The Beck Direct Video Synthesizer was designed and built by Stephen Beck last year with a grant from the National Endowment for the Arts. It provides video artists with a wholly new tool for expressive composition, with images never before produced on a television monitor. The following is a statement by Stephen Beck on the origin and configuration of his instrument; it will be followed in the second series of "Reports" by a longer and more detailed paper.)

### Genesis of the Direct Video Synthesizer

Within many of mankind's tools are latent properties unobserved even by those whose intuition has led to the design of the tool. Television is no exception. As an electronic system its range and complexity is astonishing; unfortunately, far more so than its usual content indicates. Let us go one step further than television might seem to permit and remove the TV camera, replacing it with electronic circuits which can be manipulated to effect the formation of an image on a video monitor. This is direct video synthesis. It presents the artist, or videographer, with a new potential for using television as a medium of personal expression.

I was led to color television in the search for a precise means of expressively controlling light. Conventional computer graphics displays seemed costly and neglected a common

piece of hardware -- the color television set -- as a display terminal; hence, the notion of a visual synthesizer as intermediary between control and display of an image.

It remained, however, to assess and understand the aesthetic properties of the television medium, and to formulate an aesthetic model upon which to base the construction of electronic image-forming modules which would constitute a synthesizer. With a voltage-controlled parameter approach the computer could be used to direct the image-producing modules. But more important, the videographer would have intimate control of the image through various physical -- and possibly biologically controlled -- transducers which would develop control voltages.

Sense impressions of both my inner and outer world and their subsequent intellectualization led to the formation of an aesthetic model comprised of elements of form, motion, texture and color. (A mathematical development of form as points, lines, planes and perspective illusions serves as a preconditioner for electronically realizing these elements.) The temporal changing of geometrical relationships between elements of form gives rise to motion. Texture arises as brightness gradients over the elements of form, or a macroscopic aggregate of microforms, while the spectral distribution of reflected and radiant energy of forms evokes color from our senses.



## Technical Outline of the Synthesizer

Mapping from the aesthetic model into real electronic control of video images occurs in the following way:

- i. sequences of pulse-width modulated signals are developed which define contours of form over the monitor surface;
- ii. waveshaping and amplitude modulation of these signals allows control of the brightness gradient, thus yielding texture;
- iii. proportional distribution of these signals as excitation for the primary pigments of emitted light, red, green and blue, produces the gamut of colors, with hue, saturation and intensity precisely specified.

I constructed a prototype video synthesizer employing this process, consisting of circuit and control modules which function directly with the scanned video raster. Some modules serve to generate and manipulate forms, while other modules impart differing textures to forms, or independently control their colors. Camera-originated video may also be introduced into the synthesis process. By patching desired modules together and supplying the appropriate control voltages, a given passage of images may be produced.

The synthesizer accepts video sync and drive pulses as "backside" inputs and delivers parallel RGBY (red, green, blue, luminance) outputs to an encoder, making it possible to use the system with any television format (PAL or SECAM, for

instance), an important element of flexibility. The present version produces NTSC color video.

The Direct Video Synthesizer, to be sure, is not the final word in image-making tools. It does, however, open new vistas in the use of television as a solo medium of expression, places which remain to be explored by the new video artists.

Stephen Beck